HSRC Human Sciences Research Council | CeSTII Centre for Science, Technology & Innovation Indicators

Innovation in the South African Informal Sector Survey

Statistical Report

Baseline Survey in Sweetwaters, KwaZulu-Natal, 2017–2018

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CeSTII, 2021. *Innovation in the South African Informal Sector Survey – Statistical Report Baseline Survey in Sweetwaters, KwaZulu-Natal, 2017–2018*. Human Sciences Research Council: Cape Town.

Date of publication: March 2021
Copy editing: Katharine McKenzie
Design and layout: Tracey Watson

PREFACE

This is a study of innovation in the informal sector. It covers business innovation in small, informal businesses. It is distinct from grassroots innovation, which "covers a diverse set of activities in which networks of neighbours, community groups and activists work with people to generate bottom-up solutions for sustainable development" (DST, 2018), and social innovation. This report contains the results of the Baseline Survey of Innovation in the Informal Sector (IIS) undertaken in Sweetwaters a peri-urban area in Msunduzi Municipality, KwaZulu-Natal. The survey forms part of a pioneering project that makes use of a mix of methods designed to determine and understand the innovation taking place in informal economies such as this one.

As relatively little is known about how innovation in informal settings in South Africa, and on the African continent, occurs the adoption of a mixed methods approach has provided a new depth of insight. Furthermore, researchers in the field of informal sector studies have long emphasised the need for community-based research methods in order to elicit rich responses and an openness to the research process. This work responds to that need.

Other methods used as part of the study were a set of qualitative interviews with businesses operating in three selected sectors as well as community-based organisations and government actors represented in the study area. A digital story-telling workshop enabled business owners in the area to reflect on their innovation in a perceptive manner.

In contrast with surveys of innovation undertaken in formal businesses, few if any standards have been developed to measure innovation in the informal sector. To that end, the project has developed a standardised questionnaire designed to investigate innovation within the context of South Africa's informal economies and the innovative practices that have been adopted in many locales. Elsewhere on the continent the same questionnaire is being used to measure informal sector innovation in other African countries. Appendix 1 contains the survey questionnaire.

The main purpose of this report is to present the baseline survey data that was collected in a descriptive manner. Individual case studies of innovation within some of the larger sectors of economic activity in informal settings will be published later in 2020 as companion publications. Finally, a detailed report analysing the survey data in greater detail, and including a synthesis of results from the individual case studies, will complete the suite of products from the project measuring innovation in the informal sector in Sweetwaters, KwaZulu-Natal, South Africa.

Dissemination

The findings of the 2017–2018 IIS Survey will be disseminated to stakeholders.

The report and others in the series are available on request from CeSTII and the DSI. The reports can be downloaded from the HSRC-CeSTII website (http://www.hsrc.ac.za/en/departments/cestii) and DSI website www.dst.gov.za. Care is taken to ensure the confidentiality of respondent information and the data presented in the reports are therefore anonymised as far as possible.

Data extractions in response to users' special data requests are generally provided free of charge, unless substantial analytical work is required to meet any such request. Such data extractions are done in accordance with the approved data access protocol, and requests should be sent to cestiidata@hsrc.ac.za.

Storage and archiving

The IIS Survey data will be archived according to established CeSTII and HSRC procedures. Hard copies of the IIS Survey are kept in safe storage at CeSTII. All data are stored electronically on secure servers.

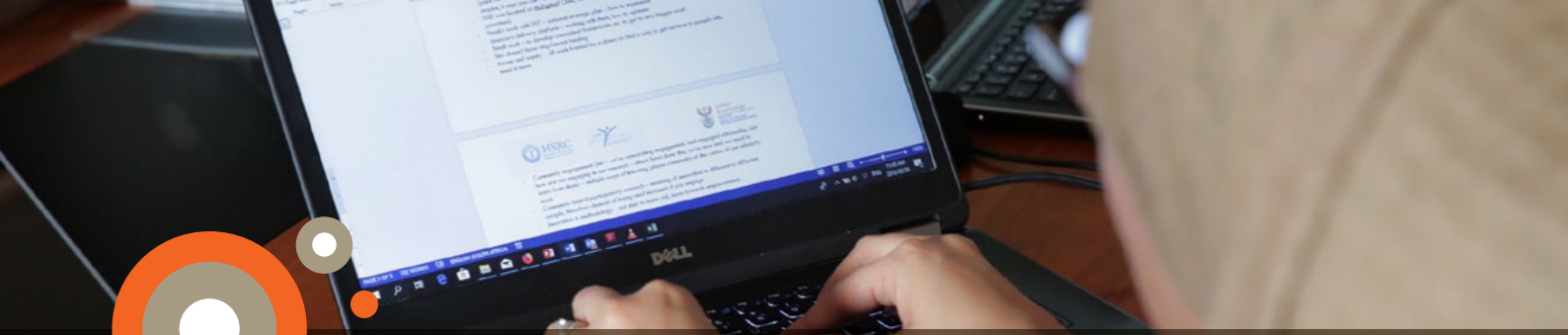
ACKNOWLEDGEMENTS

The Centre for Science, Technology and Innovation Indicators (CeSTII) at the Human Sciences Research Council (HSRC) undertook the Baseline Survey of Innovation in the Informal Sector, on behalf of the Department of Science and Innovation (DSI). The project team consisted of researchers and data collectors from CeSTII and the Human and Social Development (HSD) research programme at the HSRC. Nazeem Mustapha was responsible for the overall project leadership and led the development of the conceptual framework and survey questionnaire. Il-haam Petersen acted as the co-leader in the baseline study and was responsible for the qualitative methodology and development of the interview schedules. The following project team members assisted with a review of the literature that informed the conceptual framework and methodology, and the development of the survey questionnaire: Xolisa Magawana, Nozibele Gcora, Nhlanhla Malaza and Nicole van Rheede. Juliet Mokoele contributed to the data capturing and formatting of the data tables. Nicole van Rheede was responsible for the project management, and direct oversight of the survey component within CeSTII.

We would like to acknowledge the contributions made by the HSD research team: Emmanuel Gabela, Philip Joseph, Thulani Ngubane, Xolani Ntinga, Lungisani Ntuli, Patrick Qwabe and Alastair van Heerden. The research support provided by Rory Liedeman of the Sustainable Livelihoods Foundation was invaluable, and contributed to a key capacity-building event for the rest of the project team and the digital storytelling workshops. We would also like to acknowledge Isabel Bortagaray from the Universidad de la República Uruguay and Oluseye Jegede from Obafemi Awolowo University, Ile-Ife, Nigeria who provided invaluable guidance, technical expertise, knowledge and assistance in all phases of the project. We would also like to acknowledge the contributions made by the CeSTII Data Team, particularly Curtis Bailey, Atoko Kasongo and Sibusiso Ziqubu in providing assistance with the preparation of the data tables, cleaning, and verification of the survey data. We thank the CeSTII administrative team: Marinkie Maluleke, Zinziswa Hlakula and Vuyiseka Mpikwa for their support that often went beyond administrative duties.

CeSTII would like to thank the DSI for their support and encouragement for the implementation of the survey. This project would not have come to fruition without the advice, support and constant encouragement of the Head of CeSTII, Glenda Kruss.

Last, but not least, we thank all of the respondents who participated in the digital storytelling workshops, one-on-one in-depth interviews, pilot survey questionnaire and the final survey.



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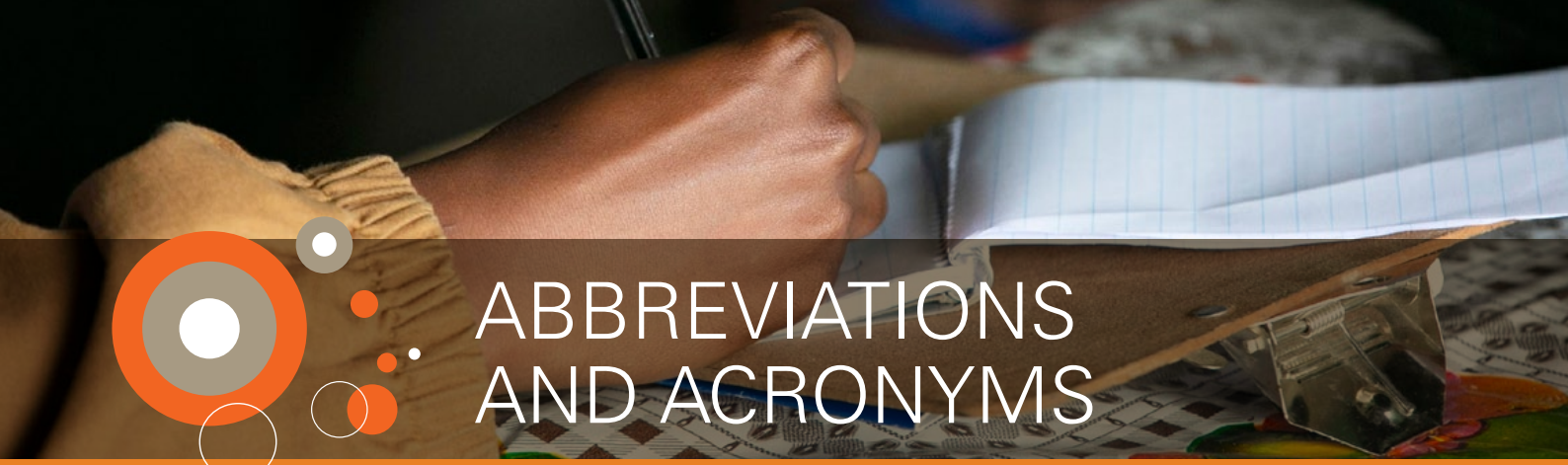


ABBREVIATIONS AND ACRONYMS

CeSTII	Centre for Science, Technology and Innovation Indicators
CIS	Community Innovation Survey
CBPR	Community-based participatory research
DSI	Department of Science and Innovation
DUIIS	Doing, Using, Interacting, Imitating and Searching
HIV/AIDS	Human Immunodeficiency Virus Infection and Acquired Immune Deficiency Syndrome
HSD	Human and Social Development research programme at the HSRC
HSRC	Human Sciences Research Council
IIS	Innovation in the Informal Sector Survey
IKS	Indigenous Knowledge Systems
IP	Intellectual Property
IPR	Intellectual Property Rights
ISIC	International Standard Industrial Classification of All Economic Activities
LIPC	Local Innovation and Production Classification
LIPS	Local Innovation and Production Systems
PLACE	Priorities for Local AIDS Control Efforts
NACI	National Advisory Council on Innovation
NESTI	National Experts on Science and Technology Indicators
NSI	National System of Innovation
OECD	Organisation for Economic Cooperation and Development
RedeSist	Brazilian Research Network on Local Innovation and Production Systems
SIC	Standard Industrial Classification
SLF	Sustainable Livelihoods Foundation
Stats SA	Statistics South Africa
STI	Science, Technology and Innovation

DEFINITIONS AND DESCRIPTIONS

Incomplete innovation refers to innovation activities that do not result in an innovation (product or process), but that are either ongoing or aborted, discontinued, or put on hold.

Informal sector enterprises are private unincorporated enterprises that are unregistered or do not keep formal accounts (EC, IMF, OECD, UN and WB, 2009). A philosophical perspective that promotes inclusivity informed the methodologies that this study espouses. This is an important fundamental in the context of informal settings, in order to promote quality of responses from the participants in the study. Therefore, in contrast to the practice adopted by national accountants and the like, the informal sector here is defined in an inclusive manner by the use of local community individuals' own perceptions of what they consider as informal sector businesses. However, there is great overlap between this definition, which is a bottom-up working definition and the definition used for statistical tabulations of national accounts or labour statistics. In many cases, informal sector businesses consider themselves to be in the informal sector, even though they may have registered as formal businesses in the past, or be considering formalisation as an aspirational ideal or motivational goal.

Innovation "is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)" (OECD, 2018).

Innovation intensity refers to the amount of resources a firm allocates to innovation, which may be proxied by innovation expenditure or human resources allocated to innovation. In this report, innovation intensity is the proportion of employees that are involved in innovation activity, expressed as a percentage.

That is, innovation intensity = $\frac{\text{employees involved in innovation activity}}{\text{total employees}} * 100.$

Innovation rate measures the fraction of successful innovators in the population; that is, excluding abandoned or ongoing innovation activity.

Innovation rate = $\frac{\text{successfull innovators}}{\text{all enterprises}} * 100.$

International Standard Industrial Classification of All Economic Activities (ISIC) is the international reference classification of production, according to the economic activities of enterprises (i.e. not the product that they produce). See https://unstats.un.org/unsd/classifications/Econ/ISIC.cshtml for a description, the chronology of ISIC revisions, and concordance tables with other economic classification schemes.

Labour productivity represents the total volume of output produced per unit of labour.

The labour productivity rate for informal sector enterprises was calculated as $\frac{\text{annual turnover}}{\text{total employees}} * 100.$

Local refers to the geographic closeness within which economic activity takes place. For example, customers and businesses are localised in that they are geographically close to each other.

Local Innovation and Production Classifications (LIPCs) are groupings of informal sector businesses involved in related production activities, from the production of raw materials and other inputs into the final production of goods and services at the local level. LIP Classifications are based on an alternative method to SIC for describing economic activities at the local level.

Local Innovation and Production Systems (LIPS) are 'groups of economic, political and social agents localised in the same area, performing related economic activities, in which formal and informal interdependence and consistent linkages usually result in cooperation and learning processes, with a potential to generate the increase of productive and innovative capabilities' (Lastres and Cassiolato, 2005:7)

Main economic activity of a business is the economic activity that generated the most income.

A **non-innovator** has no innovation (product or process), but may have incomplete innovation.

Non-response was defined as failure to obtain a measurement on one or more variables for one or more units selected for the survey. These include out-of-scope units. (Adapted from Sarndal, Swensson, and Wretman, 1992).

Out-of-scope units are defined as units that should not be included in the survey frame because they did not belong to the target population within the reference period.

"A business **process innovation** is a new or improved business process for one or more business functions that differs significantly from the firm's previous business processes and that has been brought into use in the firm" (OECD, 2018).

A **product innovation** "is a new or improved good or service that differs significantly from the firm's previous goods or services and that has been introduced on the market" (OECD, 2018).

Standard Industrial Classification (SIC) codes are recommended by Statistics South Africa (Stats SA) for describing the economic activities of industries.

A **successful innovation** is a (product or process) innovation that has been realized within the reference period. Note that a successful innovator can also have an incomplete innovation.

The **unit response rate** is the ratio of the number of units that have provided data, at least on some variables over the total number of units designated for data collection.

Response rate is calculated as the percentage of responses received from the frame = $\frac{\text{responses}}{(\text{responses}+\text{non}-\text{response})-(\text{out}-\text{of}-\text{scope})} * 100.$

A. INTRODUCTION

The informal economy is a large and vital part of the overall economy in most countries. In Africa, it is the economic activity within which most citizens participate. Moreover, it is where the majority of economic growth manifests. In fact, more than 90% of new jobs in low-income countries on the continent are created by the informal sector (Benjamin, Golub, and Mbaye, 2015). In many African countries, the informal sector undertakes important manufacturing activity, but it is mostly known for its large services sector.

Innovation in informal sectors is a particular area of economic activity that government has highlighted in the most recent Draft White Paper on Science, Technology and Innovation (DST, 2018). To read more about government's innovation-enabling policy, see www.dst.gov.za. Innovation is an intrinsic element of this sector of the economy (Kraemer-Mbula and Wunsch-Vincent, 2016). This report shows that it is so pervasive that perhaps it may even be considered a characteristic trait. The form that such innovation takes is somewhat akin to that of the 'gig economy', in that it is individual or household-based. However, unlike Uber and Airbnb, there is very little dependence on software applications. In general, innovation in the informal sector is of a non-technological nature. The main innovation activity involves using new equipment and tools towards developing capability. Furthermore, a lot of innovation activity rests on imitating, even copying the products that competitors, both formal and informal, have.

The types of economic activity rapidly change within one informal sector firm, adapting nimbly to changes in customer demand. Such rapid adaptation is necessary for the survival of informal sector firms, given the socio-economic context within which they reside, characterised by low household incomes. One expects therefore that the ability to attract customers outside of the local area becomes a determinant of profitability. While there is plenty of competitive behaviour among informal sector businesses, often sharing of information and resources are exhibited in comparable measure. According to our understanding of innovation as a systems phenomenon, those informal sector businesses that are able to leverage information sources from key actors in the locality should have more success in growing knowledge capabilities. In particular, it is expected that linkages between informal sector businesses and formal institutions and businesses would promote the introduction of new products or processes within the informal sector. When asked about potential challenges to innovation, the majority of respondents reported no barriers to their innovation attempts. This reflects, perhaps, the spirit of the owners of informal businesses who are constantly willing to adapt to changing circumstances and opportunity, often of necessity.

The Survey of Innovation in the Informal Sector was designed to look at phenomena such as these, which derive from our understanding of how innovation takes place within businesses, and from existing empirical evidence, albeit of a limited nature, of how innovation takes place in informal settings. The bulk of previous work has restricted itself to investigating this subject for a handful of industry sectors, using a case study approach. The survey methodology that was used to collect the data contained in this report allows us to investigate these matters within all industry sectors, utilising a broad identification of informal sector businesses within a locality, here, the Msunduzi region of the KwaZulu-Natal province in South Africa.

The reference period was chosen to be a two-year period from 2017 to 2018. This is in contrast to innovation surveys of formal businesses that typically employ three-year reference periods to capture the changes business implement. The reason for this choice was that it is well known that change takes place at a much faster rate within the informal sector than in the formal sector.

B. METHODOLOGY

The Innovation in the Informal Sector (IIS) Survey is based on a framework that builds on and extends the guidelines of the OECD's Oslo Manual (OECD, 2018). The definition of innovation introduced in the latest version of the Oslo Manual was found to be suitable for measuring innovation in South Africa's informal sector:

> *"…innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)."*

While the Oslo Manual (2018) provides useful insights for measuring innovation in the informal sector, the conceptual underpinnings and methodological recommendations for the CIS-type surveys that are used for measuring innovation in the formal sector in South Africa are not suitable. A survey of innovation in the informal sector in South Africa has to take into account the typical size of informal sector businesses, which tend to be survivalist and micro, and the local nature and spatial dynamics of informal sector industries.

The IIS Survey therefore adopted a framework developed specifically for studying innovation at the local level, a Local Innovation and Production Systems (LIPS) framework, which was further adapted for the informal sector in South Africa. The survey instruments, data collection methods and data analysis presented in this report was based on the adapted LIPS framework (see Figure B.1).

While the value added by informal sector economic activity is relatively low, compared to that of the formal sector, an often undervalued feature of the informal sector is its utility as a learning environment for entrepreneurs, other business owners and employees. Therefore, the networks for developing such learning in a systemic fashion within informal sector businesses is a critical explanatory variable. The use of a classification that is suited to the LIPS approach as a means of disaggregating results provides insight in this latter respect (see below for a description of the Local Innovation and Production Classification).

B.1 Local Innovation and Production Systems (LIPS) framework

The Local Innovation and Production Systems (LIPS) approach was introduced by innovation scholars at RedeSist at the Federal University of Rio do Janeiro, Brazil (Cassiolato *et al.*, 2017). The LIPS framework integrates innovation systems and development approaches in studying innovation processes. A LIPS is defined as

> *"…(a) group(s) of economic, political and social agents localised in the same area, performing related economic activities, in which formal and informal interdependence and consistent linkages usually result in cooperation and learning processes, with a potential to generate the increase of productive and innovative capabilities." (Lastres and Cassiolato, 2005:7)*

The LIPS framework emphasises the following aspects:

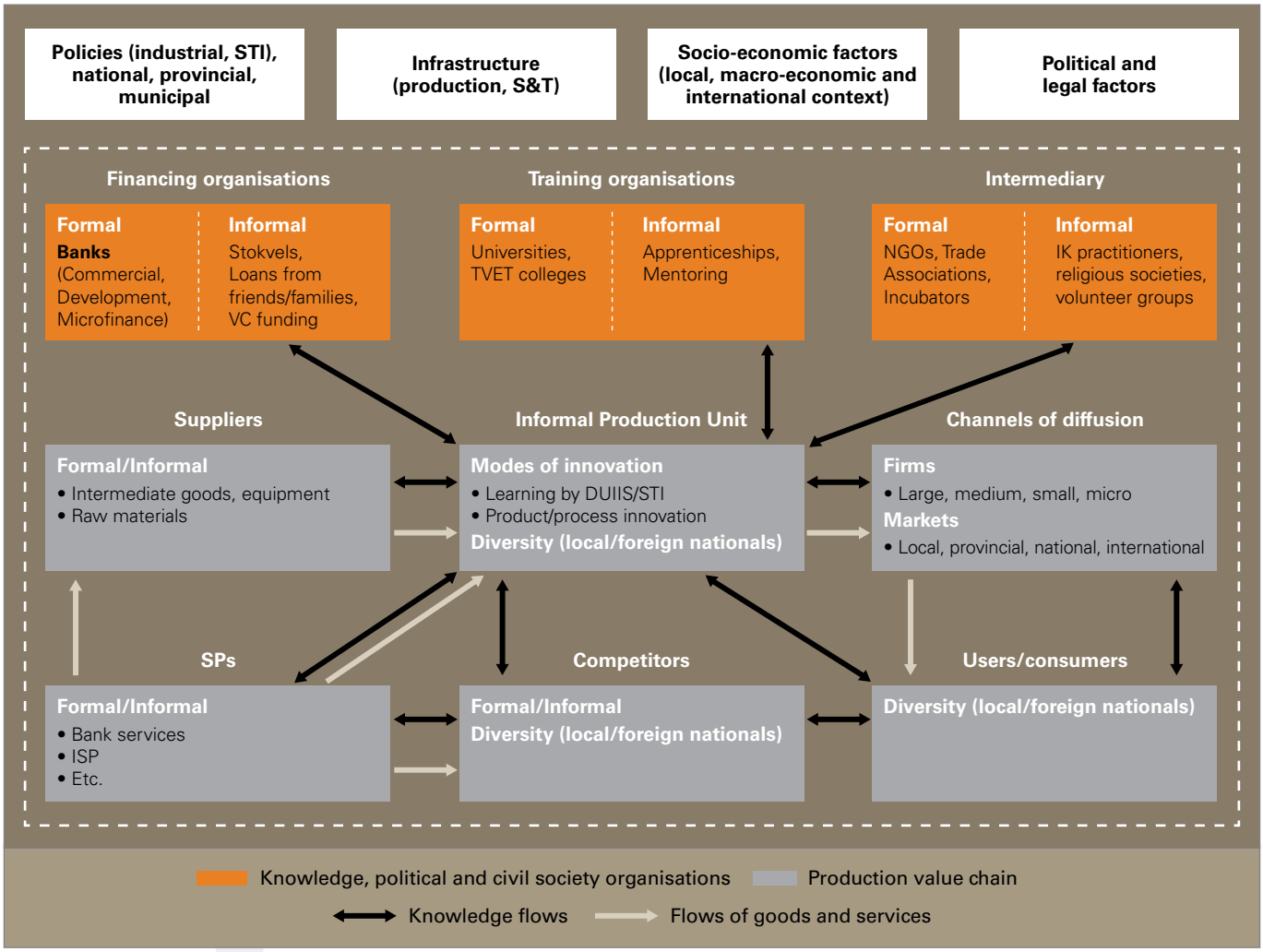
- Territorial dimension — as a specific focus of analysis and policy;
- Link between micro-, meso- and macro-dimensions;
- Diversity of activities and actors — economic, political and social;
- Interactive learning — creation, assimilation and use of knowledge — innovation;

- Coordination ('governance') — power relations and coordination among actors and activities;
- Embeddedness — common identities and goals, cooperation and commitment of the different actors and the articulation and adherence of production and innovation initiatives to the development of that particular territory (Lastres and Cassiolato, 2018).

While it is situated at the intersection between the innovation systems perspective and Latin American structuralism, the building blocks of the framework are the broader understanding of innovation, the focus on social, economic and political agents and contexts, the systemic approach, and the observance of micro-, meso- and macro-relationships (Cassiolato *et al*, 2017). Furthermore, the framework draws attention to the set of economic, political and social actors and their interactions in different territorial layers, including the local, the regional and the global. The focus is on studying the linkages among a range of actors involved in inter-related economic activities, from firms producing goods and services; to suppliers of raw materials, equipment and other inputs; distributors and traders; workers and consumers; organisations geared towards capacity building and training of human resources, information, research, development and engineering; support, regulation and financing; cooperatives, associations, trade unions and other representative bodies, as well as policy design and implementation actors. The LIPS framework places the unit of analysis as the set of agents at the collective level, going beyond the individual organisations (companies), sectors or production chains, establishing a close relationship between the territory and the economic activities (Cassiolato *et al*, 2017).

The IIS Survey builds on the LIPS approach by factoring in the peculiarities of the informal sector in South Africa, especially touching on a broad range of new actors and key stakeholders within the system, informal forms of linkages among these actors and key stakeholders, as well as the peculiarity of the socio-cultural, political, institutional and technological landscape of the continent. The framework adopted for the IIS Survey is illustrated in Figure B.1.

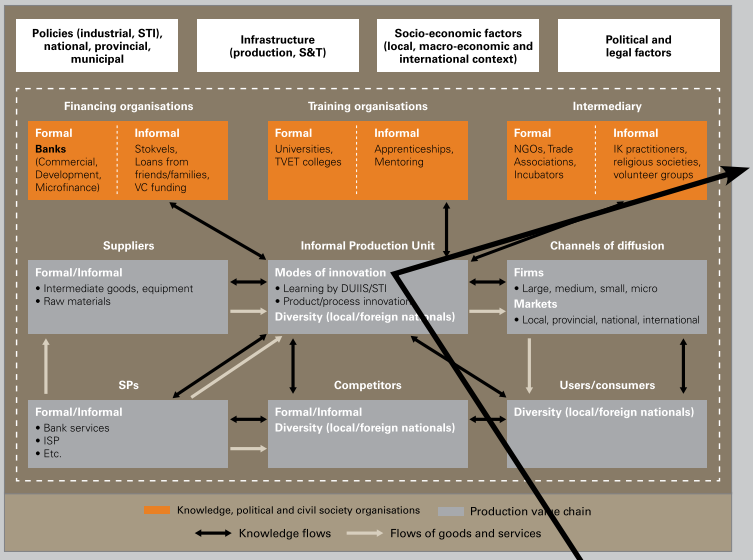
Figure B.1 Local Innovation and Production Systems (LIPS) framework adapted for the informal sector



Source: Authors (based on Cassiolato *et al*, 2017 and de Beer and Wunsch-Vincent, 2013)

As shown in Figure B.2, the IIS Survey is one component of the IIS project, which employs a novel mix of methodologies for measuring innovation in the informal sector. The methodology is based on the LIPS framework and the Small Area Census methodology (Charman *et al*, 2017). The Small Area Census methodology was designed to study economic activities in the informal sector and includes a survey component complemented by community-based participatory research (CBPR) techniques. CBPR techniques are suitable for research with hard-to-reach communities and for exploring complex concepts and processes such as innovation. CBPR was also used to inform the design of the survey (see Section B2).

Figure B.2 Mixed methods methodology for measuring innovation in the informal sector



How does innovation by informal sector businesses take place in peri-urban regions at a local level?

Survey Questionnaire

#1 - What are the main inputs and outcomes? Economic, social, environmental?

#2 - What are the main types of innovation that take place?

#3 - What are the main mechanisms and strategies for learning?

#4 - Which actors, whether formal or informal, contribute to learning?

#5 - What are the main sources of information?

Interview Schedule

#6 - How is formal and informal knowledge acquired, used and diffused?

#7 - Which forms of knowledge are valued most – scientific, traditional/indigenous or 'popular' knowledge in the community?

Digital Storytelling

Q: Tell a true story about a time when you decided to do something different in the way that you run your business and what happened.

B.2 Survey design

The questionnaire was developed in five stages.

B.2.1 Stage 1

The first step was to identify existing business surveys and surveys of innovation, in both the formal and informal sectors, that could be useful for informing a survey of innovation in the informal sector. The aim was to identify suitable variables and questions for the IIS Survey and for developing a contact listing tool. As a starting point, the South African Business Innovation Survey, which is a Community Innovation-type survey for the formal sector, was consulted and compared with existing surveys of the informal sector. The specific surveys and literature consulted are included in Section E.

B.2.2 Stage 2

The focus of the second stage was to consult experts on the measurement of business innovation and on surveying economic activities in the informal sector.

Based on the variables and questions collated during stage 1, the research team developed a list of potentially relevant questions. The list was discussed at two workshops with experts in conducting surveys of innovation in the formal sector and economic activities in the informal sector. During these workshops, the list was compared to existing surveys of innovation in the informal sector specifically. Based on these consultations, it was evident that a more contextualised understanding of innovation in the informal sector in South Africa was required. Specifically, we needed to understand how informal sector businesses in South Africa describe their economic activities and innovation activities, the modes of learning they use and what motivates them to innovate. Such an understanding was identified as crucial for not only informing the selection of questions, but also the suitability of the terminology used and the overall survey design and administration. A further review of the literature was conducted, as well as case study research based on a qualitative research technique involving digital storytelling.[1] It was decided that a mixed methods survey design would be most suitable for conducting an IIS Survey, as illustrated in Figure B.2.

B.2.3 Stage 3

The focus of the third stage was to develop a draft survey questionnaire based on the case study research. Through consultations conducted at Stage 2, digital storytelling was identified as the most suitable method. Digital storytelling is a novel method for conducting research on innovation activities and has been found to be useful for collecting fine-grained contextualised data on economic activities in the informal sector (Charman *et al*, 2017; Charman and Petersen, 2018).

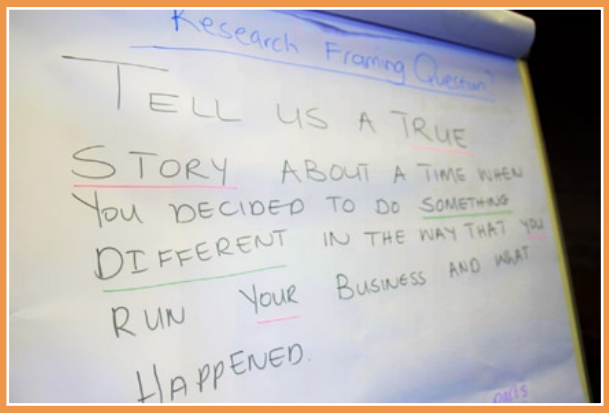
Two digital storytelling workshops were conducted in collaboration with the Sustainable Livelihoods Foundation. The first workshop was conducted with a group of informal sector businesses in a large township area in Cape Town, from 24 to 28 September 2018. A description of the digital storytelling method and process is included in Box B.1. Through this workshop, seven short video clips on the experiences, and innovation and learning activities of informal sector businesses in the township were produced.

Based on the digital stories and workshop discussions, a draft questionnaire on innovation in the informal sector was developed from the existing list of questions compiled in the two previous stages. This questionnaire was further refined based on a second digital storytelling workshop conducted with informal sector businesses in Sweetwaters, KwaZulu-Natal, the site selected for the IIS Survey. The digital storytelling workshop was conducted from 27 to 31 May 2019. Participants were recruited via the local expertise of informal sector businesses operating in the area. The community outreach team from the Sweetwaters office of the HSRC used their knowledge of the community to facilitate the process of selecting participants. The fieldworkers' judgement on which participants would be good candidates and their field notes were also taken into account. This workshop provided further insight into the kinds of innovation taking place in the selected study area, and the key drivers and conditions that support and constrain innovation and technological upgrading. In total, 15 digital stories focusing on the same guiding topic were produced from the two workshops in Cape Town and Sweetwaters.

1 The digital storytelling workshop was conducted as part of a companion study on knowledge flows between formal knowledge producers and informal sector actors in Philippi, a large township in Cape Town. The Philippi case study was part of a larger project funded by the National Research Foundation (NRF), from 2017 to 2019, under its community engagement programme.

Box B.1 Digital storytelling workshops that informed the survey design

"Digital storytelling refers to a two- to five-minute audio-visual clip combining photographs, voice-over narration, and other audio" (Lambert, 2009 cited in de Jager *et al*, 2017). According to Lambert (2013: 6), "Stories are what we do as humans to make sense of the world". Stories may be told from different angles and may be based on different focus themes or questions.



For the purposes of the IIS Survey, we sought to understand the economic and innovation activities of informal sector businesses by asking participants to reflect on their experiences of conducting business. The guiding question that the informal sector business owners were asked to address is: ***Tell us a TRUE story about a time when you decided to do something different in the way that you run your business and what happened***. Through an intense participatory process, the facilitators worked with each participating informal sector business owner to select and clarify the 'story' they wished to share. The aim was to help each 'storyteller' connect with how they felt about their experiences of conducting business in the township, and to identify a key moment of change in their businesses and how they dealt with this change. The tools that these workshops employed included the use of crayons, paints and clay that the participants used to illustrate their story. The story that participants chose was open to them, except for basic guidelines on story construction techniques. The freedom of reflection provided by this environment allowed for the identification of the nature of changing business events, and how innovation takes place in micro- and small businesses. The project team worked with the Sustainable Livelihoods Foundation (SLF) to develop a detailed programme for the workshop in Philippi and adapted that programme for the workshop in Sweetwaters. The digital stories produced were factual and narrated by informal sector business owners, in their own words. Fifteen digital stories were produced through these workshops. The digital stories can be accessed via CeSTII's webpage (http://www.hsrc.ac.za/en/departments/cestii).

B.2.4 Stage 4

The focus of the fourth stage of the survey design phase was to test the validity of the survey questions through cognitive testing. A main aim of cognitive testing is to evaluate sources of response error in quantitative questionnaires (Willis, 1999). The focus of the cognitive testing process was on evaluating the suitability of the design of the questionnaire – i.e. how respondents understood the questions – rather than how the questionnaire was going to be administered. In this way, we could assess the extent to which the draft questionnaire captured the scientific intent of each question. Specific questions that were misunderstood by the respondents or that were difficult to answer could be improved prior to fielding the survey, thereby increasing the overall quality of the survey data.

Eight interviews were conducted. The respondents were recruited based on their experience, background, availability and their ability to provide detailed feedback on the questionnaire that was being tested. The majority (six) of the respondents were informal sector businesses operating in Cape Town in the Western Cape and Sweetwaters in KwaZulu-Natal. The other two were the owners of formal micro-enterprises based in Cape Town. The feedback provided by these respondents was used to inform the finalisation of the questionnaire.

B.2.5 Stage 5

The focus of Stage 5 was to finalise the questionnaire. This was done through a project team workshop. Key changes informed by the cognitive testing included reducing the length of the questionnaire and revising questions that respondents reported to be difficult to understand. For example, the word 'apprenticeship' was not easily understood, particularly by isiZulu-speaking respondents. This term was replaced by a more context-appropriate term suggested by respondents: 'on-the-job-learning'.

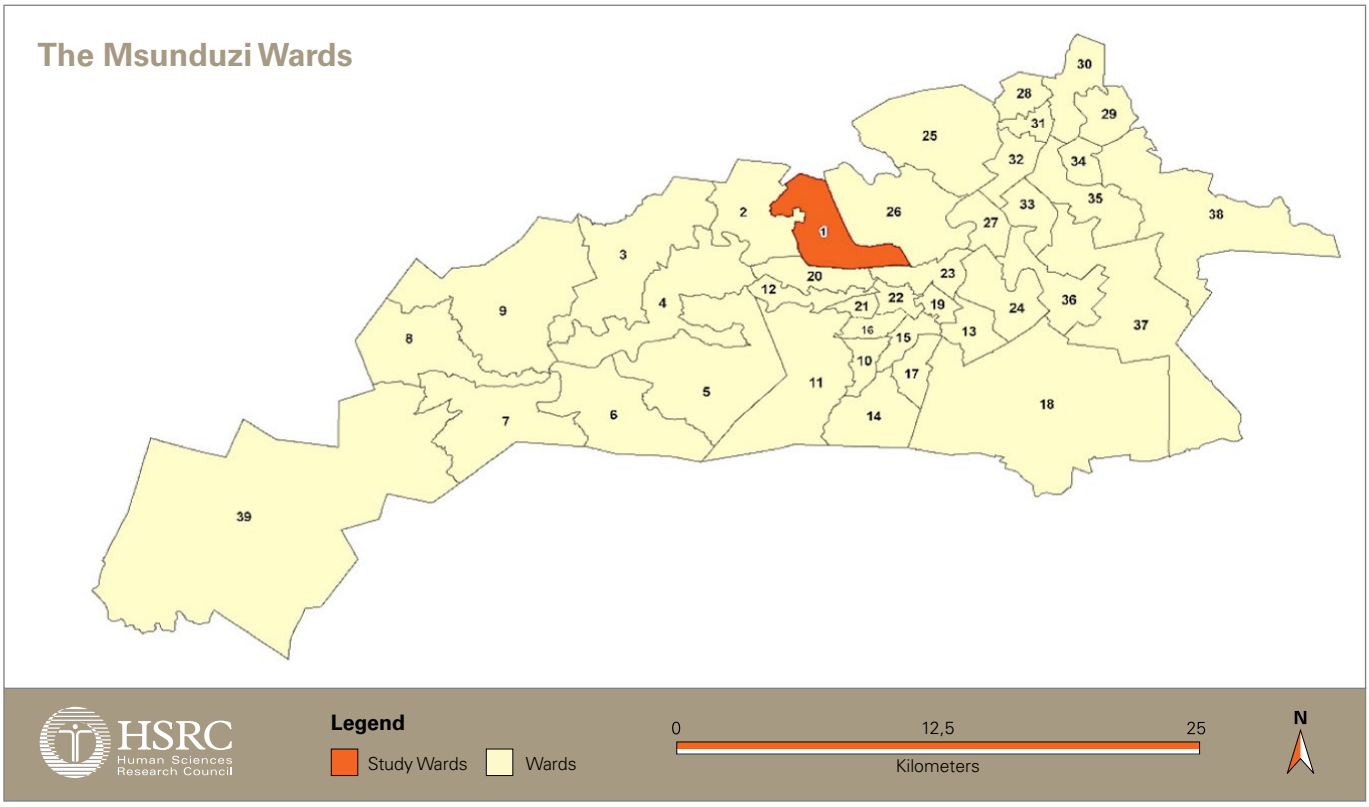
The final version of the questionnaire was converted to an online survey format using the online survey platform, RedCap. The online survey format enabled the collection of data using mobile technology, which has been found to be the most suitable method for conducting surveys of informal sector businesses (see Charman and Petersen 2018; Charman *et al.* 2017). A pdf version of the final questionnaire is included in the Appendix (see Appendix 1).

B.3 Frame, sample selection and fieldwork

B.3.1 Study area

The Innovation in the Informal Sector (IIS) Survey was conducted in Mpumuza "Sweetwaters" in Pietermaritzburg, KwaZulu-Natal. Mpumuza forms part of the Msunduzi Local Municipality and falls within the boundaries of the uMgungundlovu District Municipality, northwest of the coastal city, Durban. Sweetwaters is a predominantly peri-urban area, but it also has areas that are rural residential. The municipality encompasses the city of Pietermaritzburg, which is the second largest metropole in KwaZulu-Natal and the capital of the province. Pietermaritzburg is the main economic hub of the District. On a regional scale, the municipality is situated at the junction of an industrial and agro-industrial corridor. The study area is situated in the second largest local municipality in KwaZulu-Natal, which has entrenched its role and position as the political hub of the province. The municipality has established an informal sector business chamber.

Figure B.3 Map of the study area, Ward 1, Msunduzi



Following best practice guidelines for conducting a Small Area Census (Charman *et al*, 2017), a small area, Ward 1 and surrounds, was selected (see Figure B.3). This methodology fits in with the LIPS approach because it selects a local contiguous area, and surveys the businesses within. The study area had a population of approximately 18 500, with a working age population of 59% (Census, 2011 and Community Survey, 2016). The population consisted of a slightly larger proportion of females (52%) and isiZulu was the main language spoken. The businesses surveyed were mostly located within the borders of this ward. However, in practice some businesses fell outside the boundaries of Ward 1. Part of the reason for this was that some units conducted their business within the area, but resided elsewhere in the Sweetwaters locality. This poses no problem, because the main purpose of the design and selection of the study area was to have a contiguous region of economic activity to investigate. Furthermore, there were other boundaries created by topography and the location of main roads define the region of economic activity.

B.3.2 Informal production unit

Informal sector enterprises are commonly defined as all private unincorporated enterprises that produce at least some of their goods and services for sale or barter, and that are not registered for tax or a business licence, or do not keep formal accounts (EC *et al*, 2009). An unincorporated enterprise is a business that does not possess a legal identity separate from that of its owner. While this definition may describe many businesses operating in the informal sector, it does not cover the full range of businesses. For example, businesses may be registered and keep formal accounts, but are similar in character to unincorporated enterprises in the informal sector in that they operate from a shipping container or makeshift premises with limited or no access to basic amenities and mainly serve the low-income market in the local area.

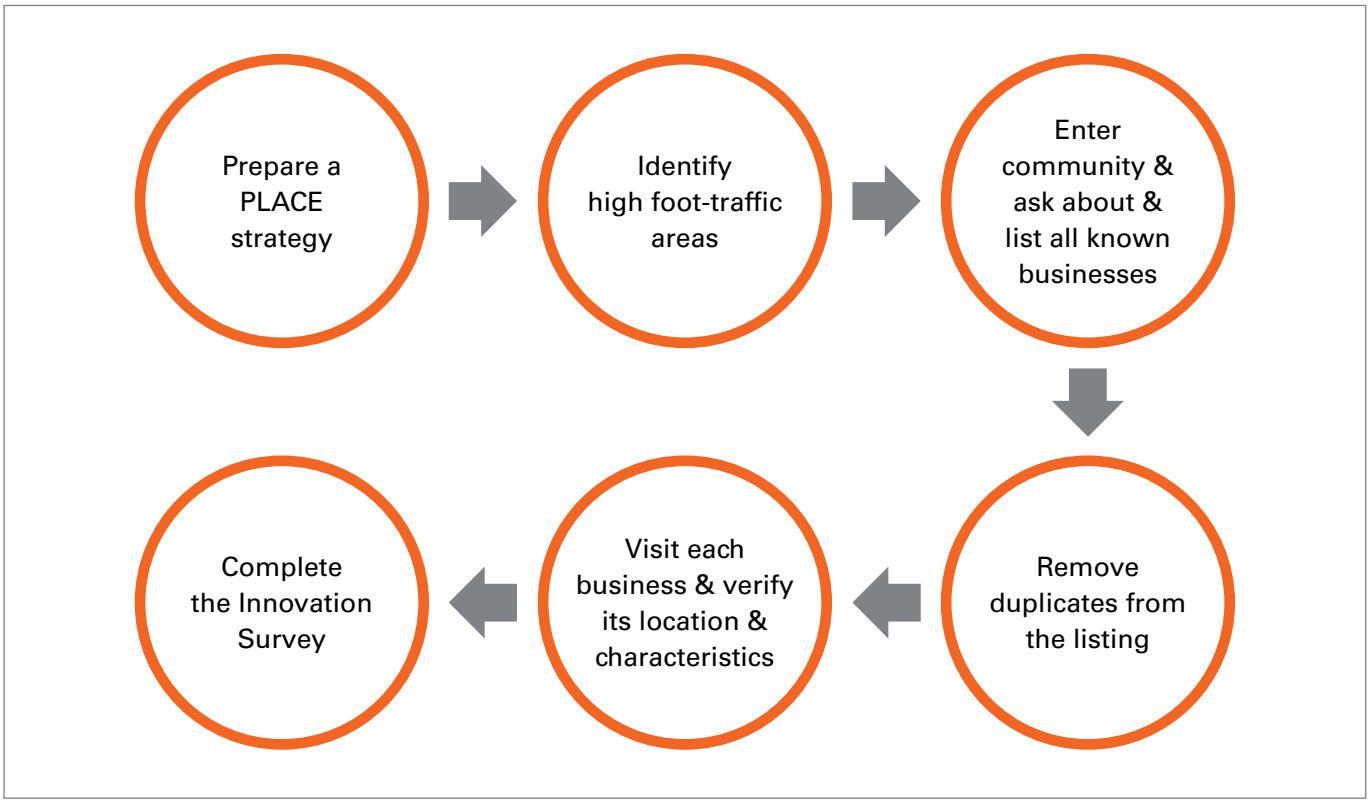
The IIS Survey thus used a more bottom-up definition, based on the characteristics identified above as well as how the business owners and others in the local area described the businesses (i.e. informal or formal). Specific research techniques, including the PLACE method used for developing a listing of informal businesses in the study area and CBPR methods, were selected to facilitate such an understanding.

B.3.3 Developing a frame

A comprehensive list of businesses in the informal sector in South Africa, particularly at the area level, could not be found. The first step was therefore to conduct a census of businesses in the selected study area.

Based on the LIPS framework and consultations with community-based research experts at the HSRC, an area-based approach was adopted. This was based on an adapted version of the Priorities for Local AIDS Control Efforts (PLACE) method (Weir *et al*, 2003), a participatory approach used to map the spatial dynamics of the HIV/AIDS pandemic in South Africa. The approach had been used in the selected study area. The process is illustrated in Figure B.4 and is similar to area-based methods used for measuring business activities in the informal sector such as the Small Area Census method (Charman *et al*, 2015), and is aligned with a LIPS approach.

Figure B.4 Process for conducting a census of businesses in the selected study area

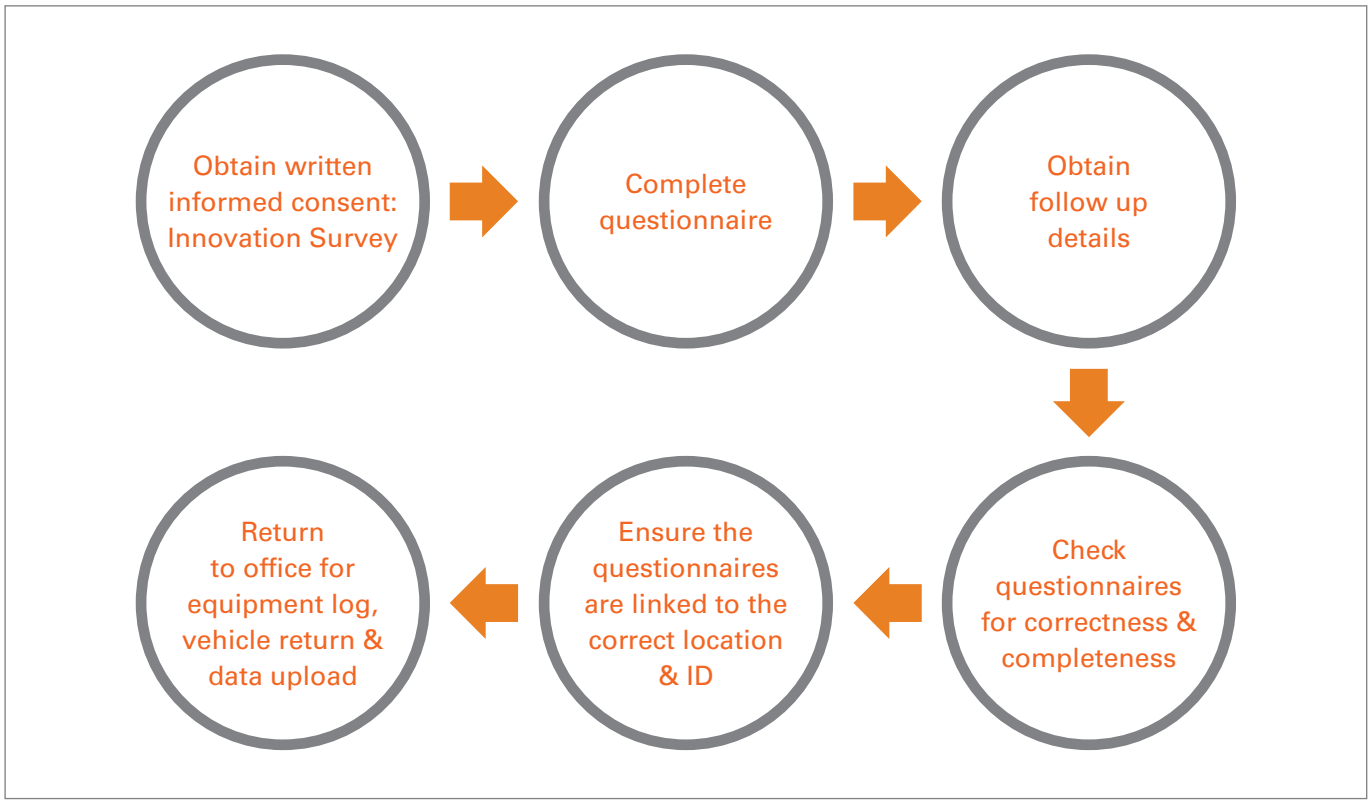


The PLACE method was put into operation in two steps: 1) a listing tool and 2) a verification process. First, consultation meetings were held with community gatekeepers and others with strategic information about the area. The consultation meetings were important for informing key leaders in the area, such as the Ward Councillor and traditional leader, of the study and to negotiate access. In consultation with community representatives, high foot-traffic locations and spaces where people congregate were identified. These locations were used as starting points for walking and driving through the community and asking people about businesses in the area. As soon as one informal sector business was found or mentioned, the data collectors proceeded directly to the site. With the use of a GPS device, the business's position and location was geocoded. Second, with the consent of the business owner, the verification form was completed (see Appendix 2). The purpose of this two-step process was to develop an understanding of how the community perceived informality, and to generate a spatial representation of informal sector businesses. Through this process, a list of businesses, with a geocoded position and location, and an indication of economic activity was produced. The final business listing verified included 1 289 informal sector businesses, after removing duplicates and businesses with no industrial classification.

B.3.4 Innovation survey fieldwork

The fieldwork, including the business listing and IIS Survey, was conducted from June to July 2019. With the use of mobile technology, the questionnaire was administered through face-to-face structured interviews with informal sector business owners at their business premises and at times convenient for them. Figure B.5 illustrates the IIS Survey fieldwork process. Of the 1 289 informal sector businesses contacted, 996 completed questionnaires were returned, after removing duplicates.

Figure B.5 Fieldwork process for administering the Innovation in the Informal Sector Survey instrument



B.3.5 Quality indicators of survey coverage, fieldwork and analysis

'Non-response' is the failure of a survey to collect the data on all survey variables, from all the units designated for data collection in a sample (Sarndal, Swensson, and Wretman, 1992). Response may be of two types – unit response or item response. Response is monitored with two quality indicators of response, quantified by two metrics for each type.

B.3.5.1 Unit response

The unit response rate is the ratio of the number of units that have provided data, at least on some variables, over the total number of units designated for data collection. The response rate was defined as the proportion of units designated for collection that responded to both the verification and innovation survey tools.

The different categories of unit non-response that occur in a survey include out-of-scope units, refusals and unavailable units. Out-of-scope units are those that should not have been included in the sample from the outset.

$$\text{Response rate} = \frac{\text{responses}}{(\text{responses} + \text{non-response}) - (\text{out-of-scope})}$$

Due to the design of the innovation survey, which is based on collecting data on businesses in a geographical area, there were no out-of-scopes. The main obstacle to response was the unavailability of some business owners to be interviewed in the field at all times of the day, including business hours. For these respondents, alternative times had to be arranged. Table B.1 shows the unit response data.

Table B.1 Unit response

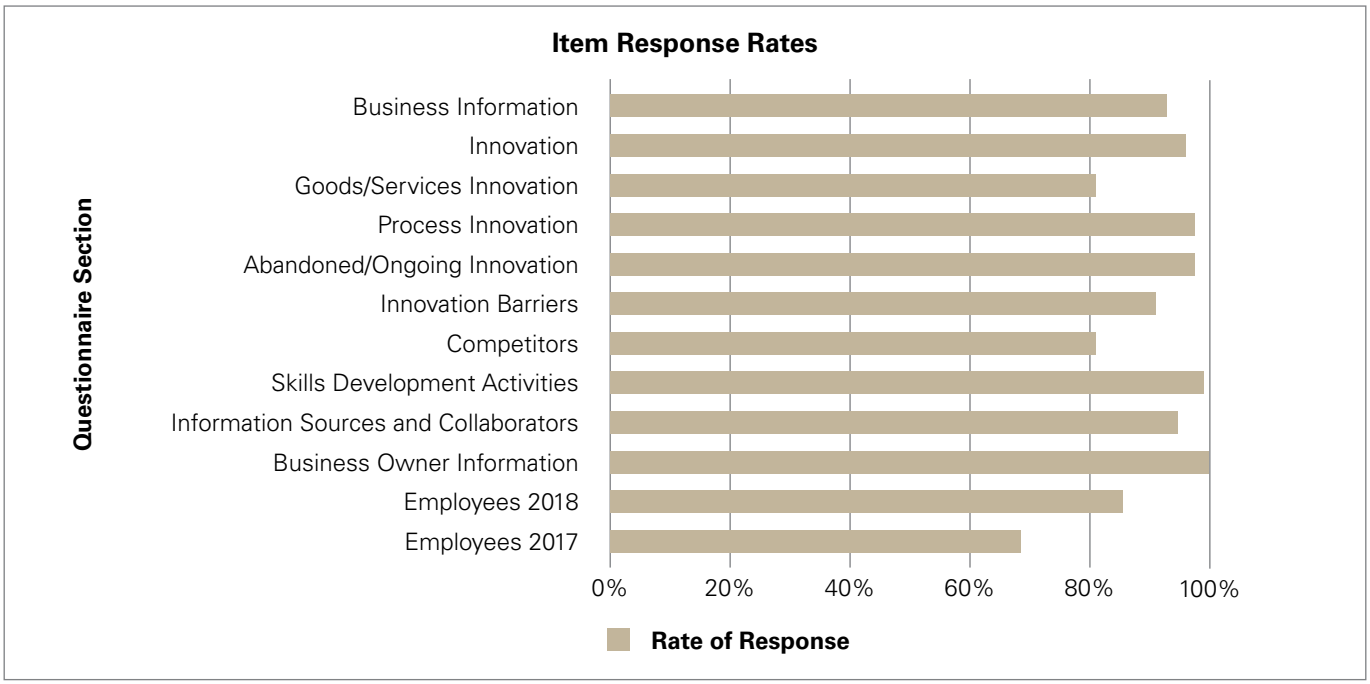
	Number
Total surveys	996
Total number of businesses contacted	1 289
Response rate as at 19 July 2019	77,3%

B.3.5.2 Item response

An item is a specific survey variable. Item response rate is the number of responses to a particular survey variable as a proportion of the total possible number of responses for that item. In order to summarise the item response, we have calculated the response rates for a section of the survey, which is made up of a number of items in each case in an analogous fashion.

The survey comprised of 14 sections. The item response data for each section is displayed in Figure B.6.

Figure B.6 Item response per section



B.4 The classification of economic activities

Two approaches to classifying economic activities were used, a standardised method based on international best practice, and a method that uses the natural boundaries of local innovation and production networks to reveal the key economic activities in the selected study area. The latter approach is better aligned with the LIPS methodology. It allows for the development of insights pertinent to the informal sector: the relation between production activities and the local territory – that is the 'localness' of production activities – as well as potential learning and competence-building networks.

In the interest of coherence and comparability with other South African innovation and economic survey data, Stats SA's standard industrial classification (SIC v.7) framework was used, as a first step, to classify the economic activities of businesses covered by the IIS Survey. In the most recent edition of SIC, which is based on ISIC Rev.4, Stats SA recommends an alternative aggregation that is considered to be more suitable for the analysis of economic activities in the informal sector (see Stats SA, 2012: 250). The informal sector businesses were firstly grouped according to this alternative aggregation, which allowed for an initial overview of economic activities in the study area and the identification of key economic activities.

Secondly, drawing on the LIPS framework, the informal sector businesses were grouped into production networks covering the range of activities from the production of raw materials and other inputs into the final production of goods and services at the local level. These two steps are described below.

B.4.1 Challenge of collecting SIC in the field

Assigning SIC codes to businesses in the informal sector was a major challenge in the absence of a reliable listing of informal sector businesses. The initial plan was to have the classification completed by fieldworkers on a daily basis, based on the data collected through the survey tool and field notes. This was not possible due to restrictions related to the online survey format and the capability level of the fieldworkers. The initial SIC codes were therefore recorded by the fieldwork coordinator after the completed questionnaires were returned. These classifications underwent a two-step process of verification to ensure that businesses were assigned the most suitable SIC code. The fieldwork coordinator assigned the SIC codes based on the data collected by the fieldworkers. Where further clarification was required, follow-up calls with the survey respondents were conducted after the conclusion of the fieldwork period.

The final SIC codes were informed by a combination of data:

- description of the main products,
- the type of business, and
- the name of the business.

This combination of data was considered more reliable than using the description of the main products alone, particularly when these descriptions did not include sufficient detail. In the instances when conflicting information was provided, the variables containing the most consistent description were used, based on these guidelines:

- First, assign the SIC code based on the description of the main goods and services offered by the business.
- Second, use the business type and business name variables to infer the economic activity if these two variables were consistent, and differed from the main goods and services description.

Considering the complexity of economic activities in the informal sector, differentiating the main economic activities from secondary and ancillary activities was not always simple. The following rule was used: the economic activity that generated the most income was identified as the main economic activity.

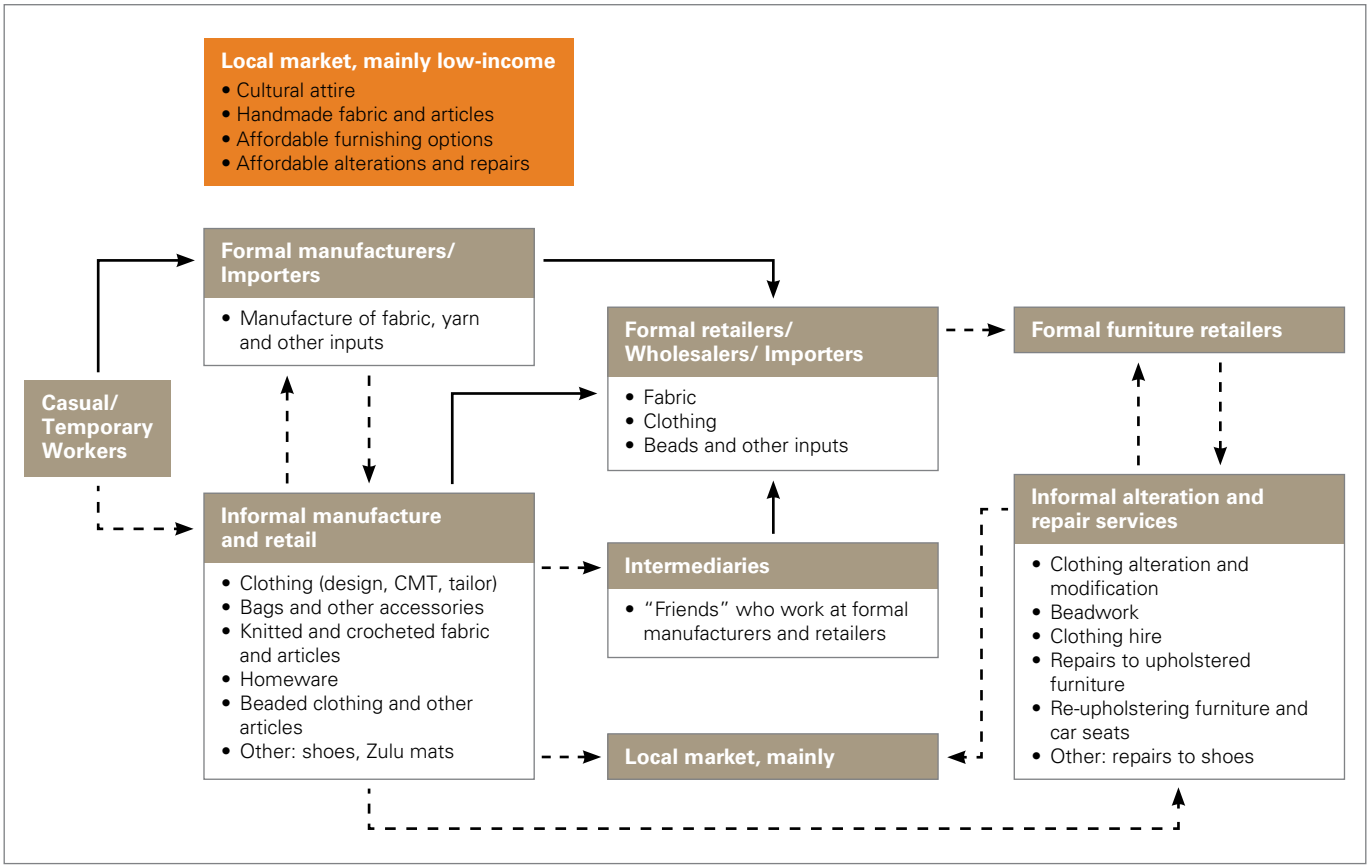
Based on the process described above, it was possible to categorise the economic activities in the study area according to standardised aggregates. However, while the SIC aggregation recommended for the informal sector facilitates comparability, the standardised aggregates may not adequately represent the dynamics of economic activities at the local level. For example, hair salons and barbershops are typically significant in township economies similar to the study area but, based on SIC, are captured as 'Other personal service activities'. Another challenge was to classify the economic activities of businesses offering personal, single services such as hemming trousers and repairing handbags. Also, a large proportion of informal retail businesses in township economies operate from a fixed location, and often a fixed structure. It is therefore argued that the recommended SIC category of 'Retail trade not in stores' may not be helpful (see Appendix 3).

B.4.2 Alternative aggregation for the informal sector

In order to better capture 'real production structures' at the local level, an alternative aggregation was used based on the LIPS framework (Lastres 2012: 4). These aggregates are referred to as "Local Innovation and Production Classification (LIPC)" categories. Table B.2 includes the final LIPC categories identified through the IIS Survey, with the corresponding SIC classes.

The LIPC categories are informed by an analysis of the production value chains identified through the IIS Survey, based on the SIC codes, or by an identification of businesses that would form part of the learning network within that production value chain. Figure B.7 provides an example of the value chain analysis that informed one particular LIPC of the 14 identified in the Sweetwaters area.

Figure B.7 Wearing apparel and homeware value chain



Source: Authors (based on van der Westhuizen (2006) and the 2017/18 IIS survey data)

The informal sector businesses with related production activities were grouped together to form an initial set of categories. The final LIPC categories were informed by a review of the literature on economic activities in the informal sector in South Africa and Africa. When the literature on the informal sector was not available for an economic activity, the literature on the formal sector was consulted. The interviews conducted with informal sector businesses as part of the case study research component of the IIS Survey project were analysed to inform the final LIPC categories.

The aggregation thus allows for the analysis of economic activities in the informal sector that goes beyond a focus on an individual business or specific industrial sectors. Rather, the focus is on local systems that may be interlinked, and include interaction and feedback between producers and users of related goods and services. The LIPC also allows for the identification and analysis of support structures and services important for competence-building at the local level (see Category M in Table B.2). The potential value of this alternative LIPC aggregation will be further explored through more in-depth quantitative and qualitative data analysis.

Table B.2 LIP Classification concordance with SIC industry classification

Category	Title	Sub-category titles	SIC classes
A	**FOOD SERVICES**		
A.1	Animal and fresh produce production	Animal production; Fruit and vegetable growing; Mixed farming	01130, 01440, 01500
A.2	Bakery products	Manufacture and retail of cakes and other bakery products	10710
A.3	Wholesale and retail services	Wholesale and retail of live animals, meats, eggs; Retail of fruit and vegetables; Liquor retail; Spazas, mobile tuckshops and houseshops	47212, 47211, 47220, 47110
A.4	Food and beverage service activities	Events catering and catering equipment rental; Fast food cafes/take-aways; Taverns	56210, 56101, 56300
A.5	Other	Cooling services; Rental of hubbly bubblies	77100, 77290
B	**BUILDING SERVICES**		
B.1	Construction of buildings	Construction of buildings; Bricklaying; Roofing	41000, 43909
B.2	Electrical, plumbing and other construction installation activities	Electrician; Plumbing and air-conditioning installation	43210, 43220
B.3	Building completion and finishing	Plastering and painting; Carpentry; Tiling; Ceiling fitting; Glazing and door fitting; Fencing construction	43301, 43302, 43309
B.4	Other	Boiler maker, Welding; Manufacture of clay building materials; Retail sales of building materials	43909, 23920, 47420
C	**HAIRCARE & COSMETICS**		
C.1	Hairdressing	Hairdressing and beauty treatment	96021
C.2	Retail of hairstyling articles	Wig selling	47610
C.3	Retail of cosmetics and perfume	Perfume sales; Cosmetics sales	47620
D	**WEARING APPAREL & HOMEWARE**		
D.1	Manufacture and retail sale of clothing	Dressmaking/Tailors; Clothing selling; Fashion design; Traditional attire and beads selling; Bags selling	14100, 47610, 74100
D.2	Manufacture, repair and retail sale of footwear	Shoe makers; Shoe repairs; Shoe sellers	15200, 95230, 47610
D.3	Manufacture, repair and retail of homeware	Upholstery repairing; Retail sale of linen; Manufacture of traditional rugs/carpets	95240, 47410, 13930
E	**VEHICLE REPAIRS & MAINTENANCE**	Mechanical repairs and maintenance; Panel beating; Auto electrical services; Repair of tyres; Repair of canopies	45200
F	**ACCOMMODATION**	Landlord (long-term rental); Other accommodation	68100, 55900
G	**METALWORK**		
G.1	Manufacture and repair of fabricated metal products	Fencing, welding and other steel work; Installation of motorised gates	33110, 43210
G.2	Repair of household appliances	Domestic refrigerator repairing services	95220
G.3	Recycled materials	Recycling	46691
H	**TRANSPORT SERVICES**		
H.1	Passenger transportation	School bus transportation; Meter taxi; Other road transport	49223, 49222, 49229
H.2	Other	Leasing of motor vehicles	77100

Continues overleaf...

Category	Title	Sub-category titles	SIC classes
I	**CREATIVE ARTS & ENTERTAINMENT SERVICES**		
I.1	Creative Arts	Visual artists and other creative arts activities; Specialised design activities; Photography services	90000, 74100, 74200
I.2	Entertainment services	Entertainment (DJ, music); Sound engineering	90000, 59200
I.3	Retail of equipment and other goods	Retail sale of music recordings; Renting of sound equipment	47520, 77309
J	**TRADITIONAL HEALERS**	Traditional healing	86900
K	**DAYCARE & PRE-SCHOOL EDUCATION CENTRES**	Day-care and pre-school education centres	88900
L	**ELECTRONICS REPAIRS & MAINTENANCE**	Repair of computers; Repair and maintenance of television, radio receivers; Repair and maintenance of cellular phones; Installation and maintenance of satellite dishes (DSTV)	95110, 95210, 95120, 43210
M	**BUSINESS SUPPORT SERVICES**		
M.1	Marketing support	Media businesses	73100
M.2	Financial support	Loan sharks	64920
M.3	Other	Internet café	63990
N	**OTHER PRODUCTS**		
N.1	Home-based industries	Avon selling; Herbalife selling; Tupperware selling	47890
N.2	Home maintenance services	Gardening services	81300
N.3	Other	Car washing services; Wood selling; Selling airtime; Renting of brush-cutting machine; Traditional cigarette seller; Furniture sales; Other retail sales; Soap manufacturing	45200, 47890, 61200, 77309, 47230, 47490, 47190, 20230

Source: Authors, based on the 2017/18 IIS survey data

B.5 Data processing and analysis

The raw data was extracted from RedCap. Several data cleaning and editing processes were run on the raw data prior to constructing the summary data tables. These processes involved the identification of duplicates and units without a SIC classification. These non-eligible duplicates were removed from the collected data set. The verification data and innovation survey data were merged into one data set. Only innovation survey data that were successfully merged with verification data were considered as full responses. The rest were counted as non-responses. Outliers were detected on non-categorical variables. These outliers were removed from the calculation of estimates for those non-categorical variables where they occurred. There were several missing data items imputed from logical rules.

Full details on the data processing and analysis can be found in Appendix 5.

C. KEY FINDINGS

Within the reference period of the survey (2017–2018), innovation activity of the firm can take on any or all three of the results given below (OECD, 2018):

a. Result in an innovation (product or process).
b. Be ongoing without an innovation.
c. Be aborted, discontinued, or put on hold.

This report refers to incomplete innovation, successful innovators, and non-innovators.

Incomplete innovation refers to innovation activities that do not result in an innovation (product or process), but that are either ongoing or aborted, discontinued, or put on hold.

A **successful innovation** is a (product or process) innovation that has been realized within the reference period. Note that a successful innovator can also have incomplete innovation.

A **non-innovator** has no innovation (product or process), but may have incomplete innovation.

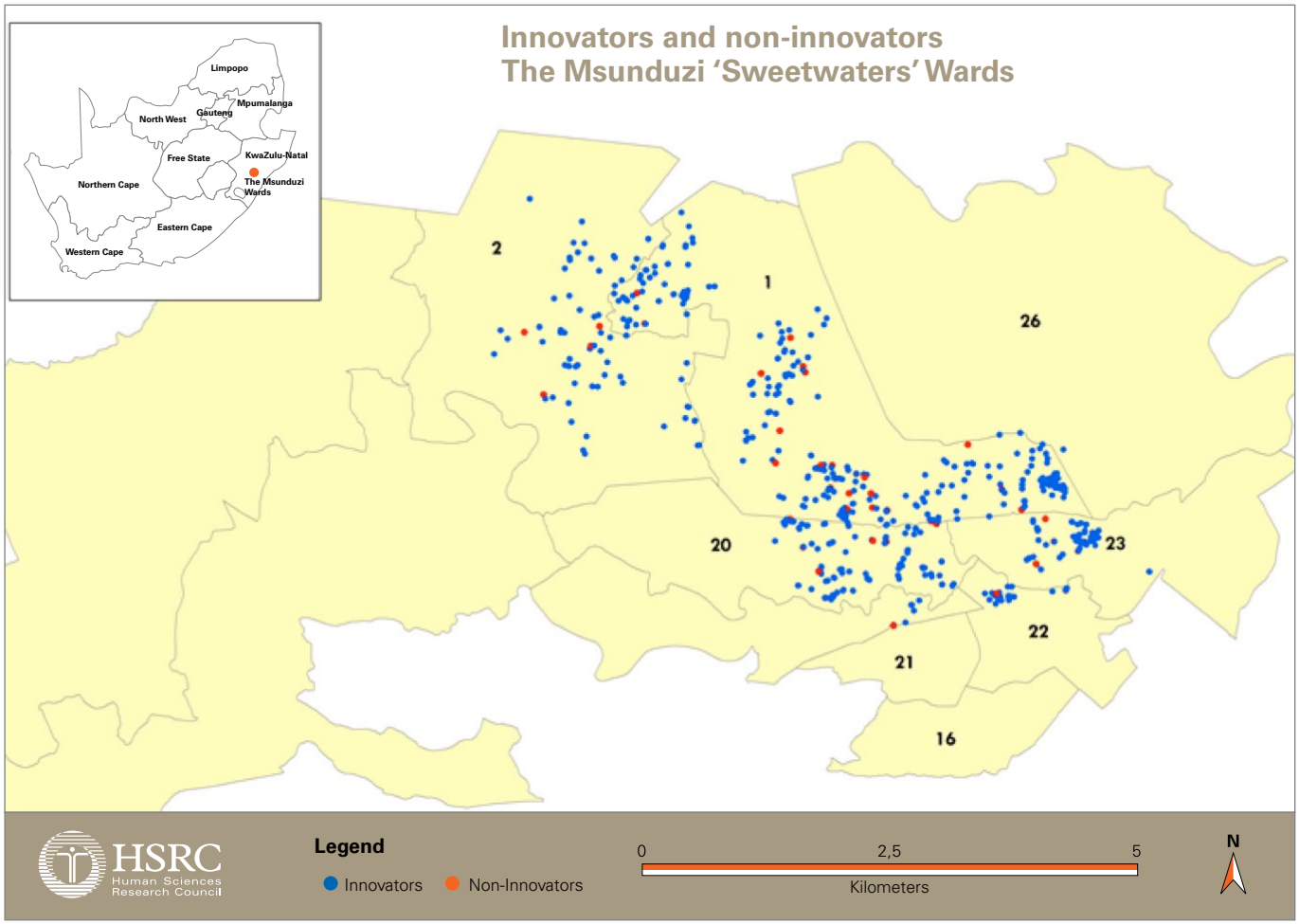
C.1 Key indicators

The innovation intensity was defined as the proportion of employees that were involved in successful innovation activity, expressed as a percentage, which was 79,9% for the Sweetwaters study area.

The innovation rate was 82,5%. The innovation rate measures the fraction of successful innovators in the population; that is, excluding abandoned or ongoing innovation activity.

The spatial distribution of successful innovating businesses in the Sweetwaters study area is illustrated in Figure C.1

Figure C.1 Spatial distribution of informal sector business innovation in the Msunduzi 'Sweetwaters' study area



The LIPC presents a sectorisation of locally operating businesses that are linked by production processes and learning processes. These are the fundamental elements comprising of businesses that are essential for being able to effect change towards sustainable growth of the LIPS within which they reside at the system level. Table C.1 presents indicators that partially describe the state of the LIPS identified.

Table C.1 Selected indicators of innovation, by LIPC

LIP Classification	Proportion of customers located inside neighbourhood	Proportion of suppliers located inside neighbourhood	Innovation rate	Product innovation rate	Process innovation rate	Proportion of employees that finished school
	%	%	%	%	%	%
Food services	44.3	59.8	85.6	67.2	81.5	43.8
Building services	32.4	60.7	84.4	58.4	80.9	32.5
Haircare and cosmetics	43.0	55.7	82.6	64.4	75.2	38.0
Wearing apparel and homeware	41.5	57.3	82.9	64.6	80.5	16.7
Vehicle repairs, maintenance and panelbeating	29.4	47.1	85.3	70.6	83.8	53.1
Other products*	44.8	58.6	77.6	48.3	75.9	47.0

Continues overleaf...

LIP Classification	Proportion of customers located inside neighbourhood	Proportion of suppliers located inside neighbourhood	Innovation rate	Product innovation rate	Process innovation rate	Proportion of employees that finished school
	%	%	%	%	%	%
Accommodation	42.5	35.0	70.0	45.0	67.5	37.7
Metalwork	25.6	43.6	82.1	74.4	82.1	41.9
Transport services	34.4	31.3	75.0	53.1	71.9	54.5
Creative arts and entertainment services	24.0	48.0	84.0	64.0	84.0	52.1
Traditional healers	24.0	68.0	84.0	64.0	76.0	22.5
Daycare centres	57.9	73.7	73.7	47.4	73.7	38.5
Electronics repairs and maintenance	33.3	33.3	66.7	55.6	66.7	46.2
Business support services	66.7	83.3	66.7	66.7	66.7	28.6
Total	**39.0**	**55.7**	**82.5**	**62.4**	**78.9**	**40.0**

* Avon selling; Herbalife selling; Tupperware selling; Gardening services; Car washing services; Wood selling; Selling airtime; Renting of brush-cutting machine; Traditional cigarette seller; Furniture sales; Other retail sales; Soap manufacturing.

C.2 Selected summary indicators of informal sector innovation[2]

C.2.1 Characteristics of informal sector businesses

The most common businesses occur in three LIPC categories: Food (27,2%), Building (17,4%) and Haircare and Cosmetics (15,0%) services. The two smallest LIPC categories, namely Electronics Repair and Maintenance, and Business Support Services, contributed less than a percent each to the overall number of businesses (See **Table D.1 Number of enterprises, by LIPC**).

Less than a third (27,6%) of the businesses belong to a cluster of businesses. Only 16,3% of businesses in the area are less than three years of age; the majority of them being at least three years old, with 26,2% older than ten years (See **Table D.2 Percentage of businesses that are part of a cluster, by LIPC**).

The biggest challenges reported by businesses are that there are too few customers (44,8%), or too much competition (48,0%) (See **Table D.14 Difficulties in selling goods and services, by LIPC**).

The most prevalent communication facility is the use of a cellular telephone (87,8%). WhatsApp is the most common social media tool used by businesses, with 32,1% of them using WhatsApp for communicating with customers, followed by Facebook, which is used by 22,8% of businesses (See **Table D.17 Social media presence, by LIPC**).

C.2.2 Employment, value added and productivity in Sweetwaters

The businesses in the study area employed 2 147 persons (including the owners) in 2018, an average of 2,2 employees per business. The proportion of employees that had finished school was 40,0%. Most owners of informal sector businesses have intermediate (grade 9) (38,9%), or a school leaving certificate (matric), or their equivalents. Whereas the fraction of female owners was 44,4%, female employees comprised 29,8% of employees. The typical person working in the informal sector was an isiZulu-speaking (98,2%) Black African (98,5%) male between the ages of 18 and 35 (43,0%). Around a fifth (20,2%) of employees had skills developed within the formal sector. The majority (52,1%) of employees obtained skills from learning to use new equipment or raw materials; but also other skills developed at work through colleagues (31,3%) or employers that

2 See Appendix 5

encourage employees to solve problems (28,9%); and many employees learnt skills through copying large formal businesses (41,0%) (See **Table D.3 Number of employees and (mean) average employee size, by LIPC (2018)**).

Informal sector personnel in Sweetwaters produced a turnover of R25 979 367 in goods and services in 2018. That means that each employee generated R12 100 in 2018 on average across all industries (See **Table D.5 Turnover, by LIPC (2018)**).

C.2.3 Product innovation

The majority of innovation activity in businesses (including informal sector businesses) occur from day-to-day activities within the business. Innovation that stems from the STI edifice forms just one component of the modes of learning. The most prevalent innovation mode is from employees learning by using (83,6%), followed by doing everyday working tasks (57,6%). Imitating products of formal businesses formed 44,1% of innovation activity. Interacting with other actors (26,0%) and appealing to technical (STI) knowledge (15,6%) and search (9,0%) activities were less prevalent learning activities (See **Table D.29 Product innovation rate by mode of innovation (percentages)**).

Most businesses stated that the source of the knowledge for innovation was that it was common knowledge (30,4%). The second most common source of knowledge for innovation was the business unit, either by adapting methods originally developed by other businesses or organisations (12,4%), or mainly by the business itself (10.1%) (See **Table D.31 Product innovation creator, by LIPC (percentages)**).

In order to benefit from their introduction, the novelty of innovations depends, firstly, on their exposure to customers or businesses in the local region (for example, the street in which trade takes place). While very few innovations were new to the world (0,6%) or new to the country (1,1%), several were new to the local area (27,5%) or new to the business (24,0%) (See **Table D.33 Novelty level of product innovations, by LIPC (percentages)**).

C.2.4 Process innovation

The proportion of businesses that implemented new processes was 78,9%. Of these process innovations, 41,7% were marketing innovations and 63,2% were organisational innovations (See **Table D.36 Process innovation rate, by LIPC**).

As with product innovations, most businesses stated that the source of the knowledge for innovation was that it was common knowledge (43,1%). The second most common source of knowledge for innovation was the business unit, either by adapting methods originally developed by other businesses or organisations (14,6%), or mainly by the business itself (13,9%) (See **Table D.39 Process innovation creator, by LIPC (percentages)**).

C.2.5 Incomplete innovation

The informal sector businesses reported that 70,8% of them had innovation activities that were ongoing or had been abandoned within the two-year reference period (See **Table D.40 Incomplete innovation (abandoned, ongoing), by LIPC**).

C.2.6 Innovation barriers

The majority of businesses reported that the following potential barriers to innovation had no effect on their innovation activities: frequent change in public policy and government (65,9%), societal dysfunction (30,5%), technology constraints (43,9%), high cost of compliance with quality and national standards (49,6%), shortage of innovation loans (36,4%), poor competitor linkages (42,1%), fierce competition in the industry (49,6%), weak linkages between businesses and knowledge institutions (67,9%), training challenges (50,0%), bureaucratic challenges (50,4%), employee challenges (52,1%), lack of access to basic infrastructure and services (52,0%), logistical challenges (42,2%), or owner hesitant to change (51,7%). However, all of these were considered to be barriers to varying degrees by a small proportion of businesses (See tables in section **D.2.5 Barriers to innovation**).

C.2.7 Technological capability for innovation

Enabling activities for innovation within the informal sector are mostly from bringing in tools, machinery and equipment (56,2%) and sourcing new suppliers of raw materials and tools (48,5%). Bringing in know-how or other types of knowledge (27,1%), making changes to buildings or infrastructure (24,8%), changing or upgrading tools and equipment (19,7%) and bringing in internet facilities and other devices (14,5%) were other activities geared to developing technological capability (See **Table D.62 New knowledge, raw materials and tools and changes to infrastructure (percentages)**).

C.2.8 Sources of information, knowledge flows and collaboration

Informal sector businesses collaborate in order to access information (25,8%) or critical expertise (32,0%). The purpose is to sell more goods (33,0%), by accessing new markets (16,0%) and finding new ways to get goods and services to customers (24,2%). Other reasons for collaborating were experimentation (8,1%) and sharing the cost of developing new goods or services or processes (15,7%) (See **Table D.64 Reasons for collaborating, by LIPC (percentages)**).

Although the majority of businesses did not interact within their own business (54,9%) or other businesses in their cluster (57,1%), 8,1% reported interacting internally and 3,8% reported interacting with other businesses in their cluster more than once a month on average. Similarly, most businesses did not interact with suppliers (59,3%) between 2017 and 2018. But 6,9% of them interacted more than once a month with suppliers. The most frequent interactions occurred between businesses and customers, with 31,3% of businesses interacting more than once month with customers, and only 23,9% reporting no interaction with customers over the two-year reference period. Most businesses (46,1%) did not interact with competitors at all between 2017 and 2018 (See **Table D.66 Strength of interaction with knowledge sources (internal, clusters), by LIPC (percentages) to Table D.72 Strength of interaction with knowledge sources (competitors), by LIPC (percentages)**).

Interaction with actors outside the production value chain was even less frequent, with the bulk of businesses reporting no interaction with NGOs (91,3%), research organisations (92,3%), government departments and extension workers (89,0%), or higher education institutions and staff (89,5%). There was also little interaction with printed or published matter (79,4%), IKS practitioners (73,1%), community-based organisations (77,8%) or trade/professional associations (82,6%) (See **Table D.74 Strength of interaction with knowledge sources (NGOs), by LIPC (percentages) to Table D.88 Strength of interaction with knowledge sources (trade associations), by LIPC (percentages)**).

The main source of funding by far was from family and friends (80,2%). Around a third (30,3%) interacted with family and friends between 2017 and 2018. However, only 13,8% of businesses reported accessing banks, 6,7% interacted with angel investors, and 18,8% interacted with loan sharks and stokvels (See **Table D.90 Main sources of business funding, by LIPC (percentages)**).

C.2.9 Marketing

The primary means of marketing businesses is from telling family and friends (60,5%) or from word-of-mouth (81,1%). Using the internet (15,5%) is among the less prevalent marketing strategies, along with the use of newer and bigger signs (13,3%), and moving the business closer to customers (11,0%) (See **Table D.103 Marketing strategies, by LIPC (percentages)**).

C.2.10 Intellectual Property (IP) protection

Informal sector business owners are aware of the value of the intellectual property (IP) that they construct. However, strategies involving devices such as patents, which are common in R&D performing business in the biotech industry, for example, are not appropriate to the context. Close to one-fifth (18,9%) of businesses employ strategies to protect IP. Of these businesses, 23,9% used division of duties, 41,5% used secrecy, 31,4% documented IP in diaries, 30,3% made the design too difficult to copy, and 27,1% selectively shared information with employees in order to protect IP (See **Table D.115 IP protection mechanisms of businesses that do protect IP, by LIPC**).

Guide to the data table categories

http://hsrc.ac.za/en/departments/CeSTii/reports-cestii

The accompanying data tables for this report (labelled **Table D.1 – D.115**) are available for download in MS Excel format.

D.1 Business characteristics
D.1.1 General business characteristics
D.1.2 Business infrastructure
D.1.3 Demographics of enterprise owners and employees
D.1.4 Business demographic events
D.2 General characteristics of innovation
D.2.1 Basic description of innovation
D.2.2 Product innovation (new products, significantly improved products)
D.2.3 Process innovation
D.2.4 Incomplete innovation
D.2.5 Barriers to innovation
D.3 Education and training of employers/employees
D.3.1 Education levels
D.3.2 Training sources
D.4 Technological capability for innovation
D.5 Sources of information, knowledge flows and collaboration
D.5.1 Knowledge sources and innovation intermediaries
D.5.2 Funding sources
D.5.3 Production value chain
D.5.4 Origin of supplies, by LIPC
D.6 Innovation outcomes
D.7 IP protection

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